INT-12 US

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**

Total Score 135

NOTES/COMMENTS; Portion of reach downstream has been recently impacted by parking area construction. This area would score lower.

High Gradient Stream Data Sheet

STREAM NAME: *INT-12 DS* | LOCATION: *Ass#8*

STATION: | DRAINAGE AREA (AC) | BASIN/WATERSHED *Big Sandy River*

LAT: *38-05-43.7* LONG: *82-38-22.7* | COUNTY; *Lawrence* USGS 7.5 TOPO;

DATE: *2-11-09* TIME: : ☑ AM ☐PM | INVESTIGATORS; *Rob Lewis, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☑	☑ Intermittent showers
☐	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *55* °F. Inches rainfall in past 24 hours ___ in

100 % Cloud Cover

P-Chem: Temp (°F) *43.2* D.O. (mg/l) ___ % Saturation ___ pH(S.U.) ___ Cond.µs *119* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*2*	ft
Stream Width BF	*4*	ft
Range of Depth	*0.1-1.0*	ft
Bankfull Depth	*0.5*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☑ Culverts

Stream Flow;
☐ Dry ☐ Pooled ☐ Low ☐ Normal
☑ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☐ Shrubs
☐ Grasses ☐ Herbaceous
Number of Strata *1*

Dom. Tree/Shrub Taxa
Walnut
Oak
Sycamore

Canopy Cover;
☑ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☑ Channelization
(☑ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle *40* %	Run; ___ %	Pool *60* %
Silt/Clay (<0.06 mm)	*20*		*20*
Sand (0.06-2 mm)	*30*		*50*
Gravel (2-64 mm)	*45*		*30*
Cobble (64-256 mm)	*5*		
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

INT-12 DS

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**

Total Score

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *INT-13* | LOCATION: *Ass#9*

STATION: | DRAINAGE AREA (AC) | BASIN/WATERSHED *Big Sandy River*

LAT: *38-05-35.3* LONG: *82-38-18.7* | COUNTY; *Lawrence* USGS 7.5 TOPO;

DATE: *2-11-09* TIME: __:__ ☑ AM ☐PM | INVESTIGATORS; *Rob Lewis, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *55* °F. Inches rainfall in past 24 hours ___ in

70 % Cloud Cover

P-Chem: Temp (°F) *43* D.O. (mg/l) ___ % Saturation ___ pH(S.U.) ___ Cond.µs *159* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*1.5*	ft
Stream Width BF	*3.5*	ft
Range of Depth	*0.1-0.3*	ft
Bankfull Depth	*0.4*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;
☐ Dry ☐ Pooled ☐ Low ☐ Normal
☑ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☐ Shrubs
☐ Grasses ☐ Herbaceous
Number of Strata *1*

Dom. Tree/Shrub Taxa
Dogwood
Oak
Pine

Canopy Cover;
☐ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☑ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☐ Channelization
(☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle ___ %	Run; *80* %	Pool *20* %
Silt/Clay (<0.06 mm)		*10*	*25*
Sand (0.06-2 mm)		*10*	*25*
Gravel (2-64 mm)		*10*	*25*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock		*70*	*25*

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0

INT -13

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**

Total Score

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *INT-14* | LOCATION: *Ass#7*

STATION: | DRAINAGE AREA (AC) | BASIN/WATERSHED *Big Sandy River*

LAT: *38-05-45.6* LONG: *82-38-18.6* | COUNTY; *Lawrence* USGS 7.5 TOPO;

DATE: *2-11-09* TIME: : ☑ AM ☐PM | INVESTIGATORS; *Rob Lewis, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER: Now / Past 24 hours

- ☐ / ☐ Heavy rain
- ☐ / ☐ Steady rain
- ☑ / ☑ Intermittent showers
- ☐ / ☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *55* °F. Inches rainfall in past 24 hours ___ in

100 % Cloud Cover

P-Chem: Temp (°F) *43.6* D.O. (mg/l) ___ % Saturation ___ pH(S.U.) ___ Cond.µs *270* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*1.5*	ft
Stream Width BF	*3.5*	ft
Range of Depth	*0.1-0.2*	ft
Bankfull Depth	*0.5*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

- ☐ Surface Mining
- ☐ Deep Mining
- ☐ Oil Wells
- ☐ Land Disposal
- ☐ Construction
- ☐ Commercial
- ☐ Industrial
- ☐ Row Crops
- ☑ Forest
- ☐ Pasture/Grazing
- ☐ Silviculture
- ☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

- ☐ Dams
- ☐ Island
- ☐ Other
- ☐ Bridge Abutments
- ☐ Waterfalls
- ☑ Culverts

Stream Flow;

- ☐ Dry
- ☐ Pooled
- ☐ Low
- ☐ Normal
- ☑ High
- ☐ Very Rapid or Torrential

Stream Type;

- ☐ Perennial
- ☑ Intermittent
- ☐ Ephemeral
- ☐ Seep

Riparian Vegetation:

Dominate Type:

- ☑ Trees
- ☐ Shrubs
- ☐ Grasses
- ☐ Herbaceous

Number of Strata *1*

Dom. Tree/Shrub Taxa

Walnut

Oak

Pine

Canopy Cover;

- ☑ Fully Exposed (0-25%)
- ☐ Partially Exposed (25-50%)
- ☐ Partially Shaded (50-75%)
- ☐ Fully Shaded (75-100%)

Channel Alterations;

- ☐ Dredging
- ☑ Channelization (☑ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle ___ %	Run; *100* %	Pool ___ %
Silt/Clay (<0.06 mm)		*20*	
Sand (0.06-2 mm)		*40*	
Gravel (2-64 mm)		*30*	
Cobble (64-256 mm)		*10*	
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	**5** 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 **7** 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 **6**	5 4 3 2 1 0

INT-14

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**

Total Score 79

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *INT-15* | LOCATION: *Ass#5*

STATION: | DRAINAGE AREA (AC) | BASIN/WATERSHED *Big Sandy River*

LAT: *38-06-05.3* LONG: *82-38-14.9* | COUNTY; *Lawrence* USGS 7.5 TOPO;

DATE: *2-10-09* TIME: __:__ ☐ AM ☑PM | INVESTIGATORS; *Rob Lewis, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☑	☑ Intermittent showers
☐	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *70* °F. Inches rainfall in past 24 hours ___ in

100 % Cloud Cover

P-Chem: Temp (°F) *41.6* D.O. (mg/l) ___ % Saturation ___ pH(S.U.) ___ Cond.µs *192* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*1.5*	ft
Stream Width BF	*4*	ft
Range of Depth	*0.1-0.3*	ft
Bankfull Depth	*0.6*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments	
☐ Island	☐ Waterfalls	
☐ Other	☑ Culverts	

Stream Flow; ☐ Dry ☐ Pooled ☐ Low ☐ Normal ☑ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☑ Intermittent ☐ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type: ☐ Trees ☐ Shrubs ☑ Grasses ☑ Herbaceous

Number of Strata *2*

Dom. Tree/Shrub Taxa: *Button bush*, *Cattail*, *Rush*

Canopy Cover;
☑ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☑ Channelization (☑ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle ___ %	Run; ___ %	Pool *100* %
Silt/Clay (<0.06 mm)			*70*
Sand (0.06-2 mm)			*20*
Gravel (2-64 mm)			*10*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0

INT-15

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**

Total Score 94

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *INT-16* | LOCATION: *Ass#3*

STATION: | DRAINAGE AREA (AC) | BASIN/WATERSHED *Big Sandy River*

LAT: *38-06-16.1* LONG: *82-38-15* | COUNTY; *Lawrence* USGS 7.5 TOPO;

DATE: *2-10-09* TIME: _:_ ☐ AM ☑PM | INVESTIGATORS; *Rob Lewis, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☑	☑ Intermittent showers
☐	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *70* °F. Inches rainfall in past 24 hours ___ in

100 % Cloud Cover

P-Chem: Temp (°F) *42* D.O. (mg/l) ____ % Saturation ____ pH(S.U.) ____ Cond.µs *371* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*1.5*	ft
Stream Width BF	*3*	ft
Range of Depth	*0.1-0.5*	ft
Bankfull Depth	*0.75*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments	
☐ Island	☐ Waterfalls	
☐ Other	☑ Culverts	

Stream Flow; ☐ Dry ☐ Pooled ☐ Low ☑ Normal ☐ High ☐ Very Rapid or Torrential

Stream Type; ☐ Perennial ☑ Intermittent ☐ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type: ☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

Number of Strata *1*

Dom. Tree/Shrub Taxa: *Willow*

Canopy Cover; ☑ Fully Exposed (0-25%) ☐ Partially Exposed (25-50%) ☐ Partially Shaded (50-75%) ☐ Fully Shaded (75-100%)

Channel Alterations; ☐ Dredging ☑ Channelization (☐ Full ☑ Partial)

Substrate ☑ Est. ☐ P.C	Riffle *75* %	Run; ____ %	Pool *25* %
Silt/Clay (<0.06 mm)	*25*		*50*
Sand (0.06-2 mm)	*50*		*25*
Gravel (2-64 mm)	*25*		*25*
Cobble (64-256 mm)			
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 **6**	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	**5** 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	1 **9** 8 7 6	5 4 3 2 1 0

INT-16

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	**20 19 18 17 16**	**15 14 13 (12) 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	**20 19 18 17 16**	**15 14 (13) 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	**20 19 18 17 16**	**15 (14) 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**(5) 4 3 2 1 0**
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	**Left Bank 10 9**	**(8) 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**(8) 7 6**	**5 4 3**	**2 1 0**
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 (4) 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 (4) 3**	**2 1 0**
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 (3)**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 (3)**	**2 1 0**

Total Score 94

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *INT-17* | LOCATION: *Ass#1*

STATION: | DRAINAGE AREA (AC): | BASIN/WATERSHED: *Big Sandy River*

LAT: *38-06-19.6* | LONG: *82-38-33.2* | COUNTY; *Lawrence* | USGS 7.5 TOPO;

DATE: *2-10-09* | TIME: __:__ ☐ AM ☑PM | INVESTIGATORS; *Rob Lewis, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☑	☑ Intermittent showers
☐	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *68* °F. Inches rainfall in past 24 hours ___ in

100 % Cloud Cover

P-Chem: Temp (°F) *47* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *1137* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*3.5*	ft
Stream Width BF	*4*	ft
Range of Depth	*0.1-0.5*	ft
Bankfull Depth	*1*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☐ Forest
☐ Deep Mining	☑ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:
☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☑ Culverts

Stream Flow;
☐ Dry ☐ Pooled ☐ Low ☐ Normal
☑ High ☐ Very Rapid or Torrential

Stream Type;
☐ Perennial ☑ Intermittent
☐ Ephemeral ☐ Seep

Riparian Vegetation:
Dominate Type:
☑ Trees ☐ Shrubs
☐ Grasses ☐ Herbaceous
Number of Strata *1*

Dom. Tree/Shrub Taxa
Dogwood
Cedar
White Pine

Canopy Cover;
☑ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;
☐ Dredging
☑ Channelization
(☑ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle *75* %	Run; _____ %	Pool *25* %
Silt/Clay (<0.06 mm)			*40*
Sand (0.06-2 mm)	*25*		*40*
Gravel (2-64 mm)	*50*		*20*
Cobble (64-256 mm)	*25*		
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 **12** 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 **12** 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	**10** 9 8 7 6	5 4 3 2 1 0

INT-17

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	**Left Bank** 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	**Right Bank** 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	**Left Bank** 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	**Right Bank** 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	**Left Bank** 10 9	8 7 6	5 4 3	2 1 0
SCORE (RB)	**Right Bank** 10 9	8 7 6	5 4 3	2 1 0

Total Score 110

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *INT-18* | LOCATION: *Ass#2*

STATION: | DRAINAGE AREA (AC) | BASIN/WATERSHED *Big Sandy River*

LAT: *38-06-23.3* LONG: *82-37-33.8* | COUNTY; *Lawrence* USGS 7.5 TOPO;

DATE: *2-10-09* TIME: __:__ ☐ AM ☑PM | INVESTIGATORS; *Rob Lewis, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☑	☑ Intermittent showers
☐	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑Yes ☐No

Air temperature *68* °F. Inches rainfall in past 24 hours ___ in

100 % Cloud Cover

P-Chem: Temp (°F) *46.8* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *402* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*4*	ft
Stream Width BF	*6*	ft
Range of Depth	*0.1-0.4*	ft
Bankfull Depth	*1*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☑ Construction	☐ Forest
☐ Deep Mining	☑ Commercial	☐ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams	☐ Bridge Abutments	
☐ Island	☐ Waterfalls	
☐ Other	☑ Culverts	

Stream Flow;

☐ Dry ☐ Pooled ☐ Low ☐ Normal ☑ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☑ Intermittent ☐ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

Number of Strata *1*

Dom. Tree/Shrub Taxa

Poplar
Sumac
Willow
Box elder

Canopy Cover;

☑ Fully Exposed (0-25%)
☐ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;

☐ Dredging
☑ Channelization (☑ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle *100* %	Run; _____ %	Pool _____ %
Silt/Clay (<0.06 mm)			
Sand (0.06-2 mm)	*20*		
Gravel (2-64 mm)	*60*		
Cobble (64-256 mm)	*20*		
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

INT-18

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	**20 19 18 17 16**	**15** 14 13 12 11	**10 9 8 7 6**	**5 4 3 2 1 0**
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	**Left Bank 10 9**	**8** 7 6	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8** 7 6	**5 4 3**	**2 1 0**
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5** 4 3	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5** 4 3	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2** 1 0

Total Score 120

NOTES/COMMENTS;

High Gradient Stream Data Sheet

STREAM NAME: *Ephemeral-TYPICAL* | LOCATION: *Ass#11*

STATION: | DRAINAGE AREA (AC): | BASIN/WATERSHED: *Big Sandy River*

LAT: *38-05-40* LONG: *82-38-29* | COUNTY; *Lawrence* USGS 7.5 TOPO;

DATE: *2-11-09* TIME: __:__ ☐ AM ☑ PM | INVESTIGATORS; *Rob Lewis, Rick Heil*

TYPE SAMPLE: ☐ P-CHEM ☐ Macroinvertebrate ☐ FISH ☐ BACT.

WEATHER:

Now	Past 24 hours
☐	☐ Heavy rain
☐	☐ Steady rain
☐	☑ Intermittent showers
☑	☐ Clear/sunny

Has there been a heavy rain in the last 7 days? ☑ Yes ☐ No

Air temperature *65* °F. Inches rainfall in past 24 hours ___ in

20 % Cloud Cover

P-Chem: Temp (°F) *56.7* D.O. (mg/l) _____ % Saturation _____ pH(S.U.) _____ Cond.µs *104* ☐ Grab

INSTREAM WATERSHED FEATURES

Stream Width EOW	*0.5*	ft
Stream Width BF	*1.5*	ft
Range of Depth	*0-0.2*	ft
Bankfull Depth	*0.3*	ft
Est. Reach Length		ft

LOCAL WATERSHED FEATURES:

Predominant Surrounding Land Use:

☐ Surface Mining	☐ Construction	☑ Forest
☐ Deep Mining	☐ Commercial	☑ Pasture/Grazing
☐ Oil Wells	☐ Industrial	☐ Silviculture
☐ Land Disposal	☐ Row Crops	☐ Urban Runoff/Storm Sewers

Hydraulic Structures:

☐ Dams ☐ Bridge Abutments
☐ Island ☐ Waterfalls
☐ Other ☐ Culverts

Stream Flow;

☐ Dry ☐ Pooled ☐ Low ☑ Normal
☐ High ☐ Very Rapid or Torrential

Stream Type;

☐ Perennial ☐ Intermittent
☑ Ephemeral ☐ Seep

Riparian Vegetation:

Dominate Type:

☑ Trees ☑ Shrubs
☐ Grasses ☐ Herbaceous

Number of Strata *2*

Dom. Tree/Shrub Taxa

Oak
Sycamore

Canopy Cover;

☐ Fully Exposed (0-25%)
☑ Partially Exposed (25-50%)
☐ Partially Shaded (50-75%)
☐ Fully Shaded (75-100%)

Channel Alterations;

☐ Dredging
☐ Channelization (☐ Full ☐ Partial)

Substrate ☑ Est. ☐ P.C	Riffle ____ %	Run; *100* %	Pool ____ %
Silt/Clay (<0.06 mm)		*50*	
Sand (0.06-2 mm)		*20*	
Gravel (2-64 mm)		*20*	
Cobble (64-256 mm)		*10*	
Boulders (>256 mm)			
Bedrock			

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient.	40-70% mix of stable habitat; well suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of new fall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20-% stable habitat" lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow. Deep > 1.5 feet.	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes)	Only 2 of the 4 habitat regimes present (if fast-shallow or slow shallow are missing, score low)	Dominated by 1 velocity/depth regime.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Ephemeral - TYPICAL

4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills > 75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr.) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40-80% of stream reach channelized and disrupted.	Banks shored with gabion of cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
7 Frequency of Riffles	Occurrence of riffles relatively frequent; spacing between riffles 5 to 7 stream widths. Variety of habitat is key. In streams where riffles are continuous, boulders or logs are important.	Occurrence of riffles infrequent; distance between riffles divided by stream width is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by stream width is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by stream width is > than 25.
SCORE	**20 19 18 17 16**	**15 14 13 12 11**	**10 9 8 7 6**	**5 4 3 2 1 0**
8. Bank Stability	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable, infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable, 30-60% of bank in reach has areas of erosion, high erosion potential during floods.	Unstable, many eroded areas, "raw" areas frequently along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruptive of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
10. Riparian Vegetative Zone Width (score each bank riparian zone).	Width of riparian zone > 18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE (LB)	**Left Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**
SCORE (RB)	**Right Bank 10 9**	**8 7 6**	**5 4 3**	**2 1 0**

Total Score 89

NOTES/COMMENTS;

LAWRENCE COUNTY KY 32 WETLAND REPORT

Item No. 12-284

Wetland A is located on the northeast side of existing KY 32 at STA 20+00. According to the Cowardin classification, Wetland A would be considered a palustrine scrub-shrub wetland that is seasonally flooded (PSS1C). Total wetland area is 0.178 acres; of this area, 0.012 acres will be impacted by the project. Vegetation is dominated by black willow (*Salix nigra*) and buttonbush (*Cephalanthus occidentalis*) in the shrub stratum and cattail (*Typha latifolia*) in the herbaceous stratum. The vegetation is considered hydrophytic since 100 percent of the dominant plants are facultative (FAC), facultative wetland (FACW), and/or obligate (OBL). The soil is composed of Udorthents (UdC). The soil has a matrix color of 10YR 5/1 and mottle color of 10YR 4/6 at a depth of six to ten inches. Soil texture is loam. Low matrix chroma and the presence of common, medium, and prominent mottles are hydric soil indicators. Wetland hydrology is indicated by soil inundation to a depth of one inch and the presence of oxidized root channels. Wetland A drains to tributary of Harriet Branch.

Wetland B is located off Two Mile Creek Road near STA 197+00. The wetland would be considered palustrine emergent wetland that is saturated (PEM1B). Total wetland area is 0.184 acres, and will be avoided. The wetland was supporting hydrophytic vegetation when it was originally delineated in 2003. At the time of the current delineation, vegetation was closely cropped. Dominant vegetation that could be discerned consisted of soft rush (*Juncus effusus*), fescue species (*Festuca* sp.), panic grass species (*Dichanthelium* sp.), and sedge species (*Carex* sp.). Although an indicator status could not be assigned to all dominants, it is likely that greater than fifty percent of the vegetation has an indicator status of FAC or wetter. The soil belongs to the Orrville silt loam, frequently flooded (Or) series, which is listed on the Lawrence County hydric soils list. The soil has a matrix color of 2.5Y 6/1 at a depth of 8 to 10 inches. Common, fine, and prominent mottles of 10YR 5/6 are present. Soil texture is sandy clay. Low matrix chroma, mottling, and an aquic moisture regime are hydric soil indicators. Wetland hydrology is indicated by soil saturation at a depth of 4 inches, as well as the presence of oxidized root channels. Wetland B drains to a tributary of Smoky Valley Fork.

Wetland C is located off KY 32 near STA 72+00 and would be considered palustrine scrub-shrub wetland that is saturated (PSS1B). Total wetland area is 0.362 acres, and the area of impact is 0.077 acres. Dominant species include buttonbush, black willow, and rose species (*Rosa* sp.) in the shrub stratum and cattail, Joe pye weed (*Eupatorium fistulosum*), and seedbox (*Ludwigia alternifolia*) in the herbaceous stratum. The hydrophytic vegetation criterion is met since at least 83 percent of the dominant plants are FAC or wetter. The soil is composed of

Udorthents and has a silt loam texture. The soil is gleyed and has a matrix color of 5/N (Gley 1 page) at a depth of 8 to 10 inches. A spring contributes to wetland hydrology, and an intermittent stream runs through the middle of the wetland. Soil saturated at the surface indicates wetland hydrology.

Wetland D is located in Waste Area 13 and is the fringe of a pond with a Cowardin classification of palustrine emergent wetland that is saturated (PEM1B). The wetland area is 0.011 acres, and will be completely impacted. Vegetation is dominated by herbaceous species such as *Juncus effusus*, two other species of rush (*Juncus* spp.), and cattail. It is likely that 100 percent of the dominant plants are FAC or wetter. The soil is a combination of Udorthents and Blairton-Cruze-Marrowbone Complex. The soil is gleyed with a matrix color of 8/N (Gley 1 page) and a silty clay texture. Mottles of 2.5Y 6/4 are common, coarse, and prominent. Wetland hydrology is indicated by soil saturation at the surface and 1 to 6 inches of inundation at the wetland's edge. Wetland D drains to an ephemeral stream, then falls down the face of a highwall, becoming overland flow through a fill site, and eventually reaching a roadside ditch.

Wetland E is located in Waste Area 11 and is the fringe of a pond with a Cowardin classification of palustrine emergent wetland that is seasonally flooded (PEM1C). Total wetland area is 0.024 acres, and will be completely impacted. The dominant species are shrub-size black willow and herbaceous vegetation such as *Juncus effusus* and seedbox. The vegetation is considered hydrophytic since 100 percent of the dominant plants are FACW+. The soil belongs to the Shelocta-Hazelton-Fedscreek Complex. The soil has a matrix color of 10YR 5/2 at a depth of 8 inches. Many, coarse, prominent mottles of 10YR 5/6 are present. Soil texture is sandy clay. Low matrix chroma and mottling are hydric soil indicators. Wetland hydrology is indicated by soil saturation at the surface, inundation to a depth of 6 inches at the wetland's edge, and the presence of oxidized root channels. Wetland E drains to Wetland F.

Wetland F is located in Waste Area 11 and is a palustrine emergent wetland that is seasonally flooded (PEM1C) that drains to a pond with wetland fringe of the same classification. The wetland area is 0.226 acres, and will be totally impacted. Dominant vegetation is composed of red maple (*Acer rubrum*) in the tree stratum, buttonbush in the shrub stratum, and *Juncus effusus*, woolgrass (*Scirpus cyperinus*), and *Carex* species in the herbaceous stratum. The vegetation is considered hydrophytic since 100 percent of the dominant plants are FAC or wetter. The soil belongs to the Shelocta-Hazelton-Fedscreek complex. The soil has a matrix color of 10YR 5/1 and a sandy clay texture at a depth of 8 to 10 inches. Mottles of 10YR 4/6 are common, medium, and prominent. Wetland hydrology is indicated by soil saturation at the surface and areas of inundation to a depth of 1 inch. Wetland F drains to an ephemeral stream.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Wetland A Applicant/Owner: KY 32 Investigator: J. Clark / R. Lewis	Date: 02/24/2009 County: Lawrence State: KY
Do Normal Circumstances Exist on the site? ✓ Yes No Is the site significantly disturbed (Atypical Situation)? Yes No ✓ Is the area a potential Problem Area? Yes No ✓ (If needed, explain on reverse.)	Community ID : Transect ID: Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Salix nigra*	S	FACW+	9.		
2. *Cephalanthus occidentalis*	S	OBL	10.		
3. *Typha latifolia*	H	OBL	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 1 (in.)

Depth to Free Water in Pit: ____ (in.)

Depth to Saturated Soil: 0 (in.)

Wetland hydrology Indicators:
Primary Indicators:
- ✓ Inundated
- ✓ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ✓ Oxidized Root Channels in Upper 12"
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

SOILS

Wetland A

Map Unit Name
(Series and Phase): Udorthents (UdC)

Drainage Class: -

Field Observations
Confirm Mapped Type? Yes No

Taxonomy (Subgroup): Udorthents

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
6-10	B	10YR 5/1	10YR 4/6	com/med/prom	loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
✓ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ✓Yes No (Circle)
Wetland Hydrology Present? ✓Yes No
Hydric Soils Present? ✓Yes No

Is this Sampling Point Within a Wetland? (Circle) ✓Yes No

Remarks:
PSS1C

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Wetland B Applicant/Owner: KY 32 Investigator: J. Clark / R. Lewis	Date: 02/25/2009 County: Lawrence State: KY
Do Normal Circumstances Exist on the site? Yes No ✓ Is the site significantly disturbed (Atypical Situation)? ✓ Yes No Is the area a potential Problem Area? Yes No ✓ (If needed, explain on reverse.)	Community ID : Transect ID: Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Juncus effusus*	H	FACW+	9.		
2. *Festuca sp.*	H	NI	10.		
3. *Dichanthelium sp.*	H	NI	11.		
4. *Carex sp.*	H	NI	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). likely >50%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: _____(in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: 4 (in.)

Wetland hydrology Indicators:
Primary Indicators:
- ____ Inundated
- ✓ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ✓ Oxidized Root Channels in Upper 12"
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

SOILS Wetland B

Map Unit Name
(Series and Phase): Orrville silt loam, frequently flooded (Or)

Drainage Class: SPD

Field Observations
Confirm Mapped Type? ✓ Yes No

Taxonomy (Subgroup): Fluventic Endoaquepts

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
8-10	B	2.5Y 6/1	10YR 5/6	com/fine/prom	sandy clay

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
✓ Aquic Moisture Regime
___ Reducing Conditions
✓ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
✓ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ✓Yes No (Circle)
Wetland Hydrology Present? ✓Yes No
Hydric Soils Present? ✓Yes No

Is this Sampling Point Within a Wetland? (Circle) ✓ Yes No

Remarks:
PEM1B. Wetland vegetation has been closely cropped, but wetland vegetation was present for the original delineation in 2003.

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Wetland C Applicant/Owner: KY 32 Investigator: J. Clark / R. Lewis	Date: 02/25/2009 County: Lawrence State: KY
Do Normal Circumstances Exist on the site? ✓ Yes No Is the site significantly disturbed (Atypical Situation)? Yes No ✓ Is the area a potential Problem Area? Yes No ✓ (If needed, explain on reverse.)	Community ID : Transect ID: Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Typha latifolia*	H	OBL	9.		
2. *Cephalanthus occidentalis*	S	OBL	10.		
3. *Rosa sp.*	S	NI	11.		
4. *Eupatorium fistulosum*	H	FACW	12.		
5. *Salix nigra*	S	FACW+	13.		
6. *Ludwigia alternifolia*	H	FACW+	14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). at least 83%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 1" in stream (in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: 0 (in.)

Wetland hydrology Indicators:
Primary Indicators:
- ____ Inundated
- ✓ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12"
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

SOILS Wetland C

Map Unit Name
(Series and Phase): Udorthents (UdC)

Drainage Class: -

Field Observations
Confirm Mapped Type? Yes No

Taxonomy (Subgroup): Udorthents

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
8-10	B	Gley 1 5/N			silt loam

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
_✓_ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ✓Yes No (Circle)
Wetland Hydrology Present? ✓Yes No
Hydric Soils Present? ✓Yes No

Is this Sampling Point Within a Wetland? (Circle) ✓Yes No

Remarks:
PSS1B

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Wetland D Applicant/Owner: KY 32 Investigator: J. Clark / R. Lewis	Date: 02/24/2009 County: Lawrence State: KY
Do Normal Circumstances Exist on the site? ✓ Yes No Is the site significantly disturbed (Atypical Situation)? Yes No ✓ Is the area a potential Problem Area? Yes No ✓ (If needed, explain on reverse.)	Community ID : Transect ID: Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Juncus effusus*	H	FACW+	9.		
2. *Juncus sp. 1*	H	NI	10.		
3. *Typha latifolia*	H	OBL	11.		
4. *Juncus sp. 2*	H	NI	12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). likely 100%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
____ Stream, Lake, or Tide Gauge
____ Aerial Photographs
____ Other
✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 2-6 (in.)

Depth to Free Water in Pit: _____(in.)

Depth to Saturated Soil: 0 (in.)

Wetland hydrology Indicators:
Primary Indicators:
____ Inundated
✓ Saturated in Upper 12 Inches
____ Water Marks
____ Drift Lines
____ Sediment Deposits
____ Drainage Patterns in Wetlands
Secondary Indicators (2 or more required):
✓ Oxidized Root Channels in Upper 12"
____ Water-Stained Leaves
____ Local Soil Survey Data
____ FAC-Neutral Test
____ Other (Explain in Remarks)

Remarks:

SOILS Wetland D

Map Unit Name
(Series and Phase): see remarks

Drainage Class: SPD
Field Observations
Confirm Mapped Type? Yes ✓No

Taxonomy (Subgroup): Aquic Hapludalfs

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
8	B	Gley 1 8/N	2.5Y 6/4	com/coarse/prom	silty clay

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
✓ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:
Udorthents (UdC) and Blairton-Cruze-Marrowbone (BID)

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ✓Yes No (Circle)
Wetland Hydrology Present? ✓Yes No
Hydric Soils Present? ✓Yes No

Is this Sampling Point Within a Wetland? (Circle) ✓Yes No

Remarks:
PEM1B around fringe of pond

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Wetland E Applicant/Owner: KY 32 Investigator: J. Clark / R. Lewis	Date: 02/25/2009 County: Lawrence State: KY
Do Normal Circumstances Exist on the site? ✓ Yes No Is the site significantly disturbed (Atypical Situation)? Yes No ✓ Is the area a potential Problem Area? Yes No ✓ (If needed, explain on reverse.)	Community ID : Transect ID: Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Juncus effusus*	H	FACW+	9.		
2. *Ludwigia alternifolia*	H	FACW+	10.		
3. *Salix nigra*	S	FACW+	11.		
4.			12.		
5.			13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 1-6 (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: 0 (in.)

Wetland hydrology Indicators:

Primary Indicators:
- ✓ Inundated
- ✓ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ✓ Oxidized Root Channels in Upper 12"
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

SOILS Wetland E

Map Unit Name
(Series and Phase): Shelocta-Hazelton-Fedscreek (ShF)

Drainage Class: WD

Field Observations
Confirm Mapped Type? ✓Yes No

Taxonomy (Subgroup): Typic Hapludalfs & Dystrudepts

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
8	B	10YR 5/2	10YR 5/6	many/coarse/prom	sandy clay

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
✓ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ✓Yes No (Circle)
Wetland Hydrology Present? ✓Yes No
Hydric Soils Present? ✓Yes No

Is this Sampling Point Within a Wetland? (Circle) ✓Yes No

Remarks:
PEM1C around fringe of pond

DATA FORM
ROUTINE WETLAND DETERMINATION
(1987 COE Wetlands Delineation Manual)

Project/Site: Wetland F Applicant/Owner: KY 32 Investigator: J. Clark / R. Lewis	Date: 02/25/2009 County: Lawrence State: KY
Do Normal Circumstances Exist on the site? ✓ Yes No Is the site significantly disturbed (Atypical Situation)? Yes No ✓ Is the area a potential Problem Area? Yes No ✓ (If needed, explain on reverse.)	Community ID : Transect ID: Plot ID:

VEGETATION

Dominant Plant Species	Stratum	Indicator	Dominant Plant Species	Stratum	Indicator
1. *Juncus effusus*	H	FACW+	9.		
2. *Acer rubrum*	T	FAC	10.		
3. *Scirpus cyperinus*	H	FACW+	11.		
4. *Carex sp.*	H	NI	12.		
5. *Cephalanthus occidentalis*	S	OBL	13.		
6.			14.		
7.			15.		
8.			16.		

Percent of Dominant Species that are OBL, FACW or FAC (excluding FAC-). 100%

Remarks:

HYDROLOGY

___ Recorded Data (Describe in Remarks):
- ____ Stream, Lake, or Tide Gauge
- ____ Aerial Photographs
- ____ Other

✓ No Recorded Data Available

Field Observations:

Depth of Surface Water: 1 (in.)

Depth to Free Water in Pit: _____ (in.)

Depth to Saturated Soil: 0 (in.)

Wetland hydrology Indicators:

Primary Indicators:
- ✓ Inundated
- ✓ Saturated in Upper 12 Inches
- ____ Water Marks
- ____ Drift Lines
- ____ Sediment Deposits
- ____ Drainage Patterns in Wetlands

Secondary Indicators (2 or more required):
- ____ Oxidized Root Channels in Upper 12"
- ____ Water-Stained Leaves
- ____ Local Soil Survey Data
- ____ FAC-Neutral Test
- ____ Other (Explain in Remarks)

Remarks:

SOILS Wetland F

Map Unit Name
(Series and Phase): Shelocta-Hazelton-Fedscreek (ShF)

Drainage Class: WD

Field Observations
Confirm Mapped Type? ✓Yes No

Taxonomy (Subgroup): Typic Hapludalfs & Dystrudepts

Profile Description:

Depth (inches)	Horizon	Matrix Color (Munsell Moist)	Mottle Colors (Munsell Moist)	Mottle Abundance/Contrast	Texture, Concretions, Structure, etc.
8-10	B	10YR 5/1	10YR 4/6	com/med/prom	sandy clay

Hydric Soil Indicators:

___ Histosol
___ Histic Epipedon
___ Sulfidic Odor
___ Aquic Moisture Regime
___ Reducing Conditions
✓ Gleyed or Low-Chroma Colors
___ Concretions
___ High Organic Content in Surface Layer Sandy Soils
___ Organic Streaking in Sandy Soils
___ Listed on Local Hydric Soils List
___ Listed on National Hydric Soils List
___ Other (Explain in Remarks)

Remarks:

WETLAND DETERMINATION

Hydrophytic Vegetation Present? ✓Yes No (Circle)
Wetland Hydrology Present? ✓Yes No
Hydric Soils Present? ✓Yes No

Is this Sampling Point Within a Wetland? (Circle) ✓Yes No

Remarks:
PEM1C